

REMARKS

Claims 1, 3 and 4 are currently pending in this application.

In the final Office Action mailed November 14, 2008, pending claims 1, 3 and 4 stand rejected. More specifically, the Examiner reiterates the rejection of pending claims 1 and 3 as being anticipated by U.S. Patent No. 5,673,293 to Scarpa et al. Claim 4 stands rejected as being obvious in view of Scarpa combined with U.S. Publication No. 2004/0042566 to Eidson et al. Applicants respectfully request reconsideration.

As detailed in the previous communications from the applicants, the claims relate to a receiver that provides joint control of equalization, synchronization and gain by the use of soft and hard decision samples. Control signals for the joint control include at least a candidate error term and a combining weight. The candidate error term and the combining weight are based upon the soft and hard decision samples produced by the receiver.

As detailed on page 35 and Figure 9 of the specification, the Error Term and Combining Weight Calculator 905 has two functions: to generate candidate error terms and to provide combining weights. The candidate error terms are calculated from the hard and soft decision samples provided by the equalizer.

The soft decision sample (see Figure 10) is at a point 1050 which is proximal to the hard decision constellation point 1025. See page 36 of specification. If the soft decision point 1050 is very close to the hard decision constellation point 1025, then the combining weight is close to zero. Therefore, it can be seen through Figure 9 and the description of the specification on pages 35-36 that the combining weight is also determined based upon the soft decision sample and the hard decision sample.

Furthermore, as seen on page 38 of the specification, the candidate error terms are generated based upon the absolute values of the in-phase and quadrature

components of the base band error term. A control signal is generated by the Error Term and Combining Weight Calculator 905 and the control signal is therefore dependent upon the proximity of the soft decision sample to the hard decision sample.

The above description of the operation of the invention of claim 1 can be contrasted to the Scarpa reference. The Examiner cites column 7, line 40 through column 8, line 5 as teaching feedback signals having both soft and hard decisions to update the equalizer and timing recovery circuit. The Scarpa reference teaches a combined quadrature amplitude modulation (QAM) and vestigial side band (VSB) demodulator. The QAM/VSB receiver is adapted particularly for the reception of television transmissions. Applicants acknowledged that the slicer 156 of Scarpa does generate soft symbol decisions and then these soft symbol decisions are used in conjunction with a QAM constellation plot to generate hard decisions. See column 7, lines 41-45. Additionally, the Scarpa reference does, in very general terms, discuss that an error signal is the result of the soft error decision subtracted from the hard error decision made by the slicer 156. However, that is where the similarities between Scarpa and claim 1 diverges.

Specifically, claim 1 requires that the control signals include combining weights. The combining weights, as detailed on page 26 of the specification, are generally between 0 and 1. The combining weights are used to form a feedback sample which is then used as input data to a feedback filter 230 of Figure 2. Thus, as the present disclosure details, the combining weights have an effect upon the feedback equalizer.

In contrast, the Scarpa reference does not address combining weights at all, but instead confusingly uses terms "error signals" and "tap weights" interchangeably. For example, as detailed from column 7, line 67 through column 8, line 3, it is the "error signals received from the slicer 156" that are used as tap weights of an equalizer 152." As described above, Claim 1 requires "candidate error terms" and "combining weights" that are used in a completely different context not fairly shown by Scarpa.

As an independent basis for patentability, each of the claims require that the control signals comprised of the candidate error term and the combining weight are used to "jointly determine operation of said timing recovery module, said carrier recovery module, said automatic gain control module, and said equalization module." This limitation has not been fairly shown by the Examiner in either the Scarpa reference or any of the references cited previously.

Figure 1 of Scarpa is instructive. If we assume that the slicer 156 outputs a candidate error term to the error rotator 154, this "control signal" is only provided to the equalizer 152. The timing recovery circuit 140 (which roughly approximates the timing recovery module of claim 1) is not **jointly controlled with the other modules** of Figure 1. Indeed, the equalizer 152 is the only component that uses the output from the error rotator 154. This clearly shows that Scarpa does not meet the limitation of claim 1 which requires that the control signals **jointly** control various signal processing modules. Under these circumstances, the Scarpa reference does not disclose each and every limitation of claim 1. For this reason, the Examiner's rejection is inappropriate.

In view of the foregoing, the pending claims comply with the requirements of 35 U.S.C. § 112 and are patentable over the applied art. The applicants accordingly request reconsideration of the application and a mailing of a Notice of Allowance. If the Examiner has any questions or believes a telephone conference would expedite prosecution of this application, the Examiner is encouraged to contact Chun M. Ng at (206) 359-8000.

Respectfully submitted,
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